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ON THE USE OF THE SUCKING-FISH FOR CATCHING FISH AND TURTLES: STUDIES IN ECHENEIS OR REMORA, II.

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THE FISHERMAN-FISH IN MOZAMBIQUE WATERS

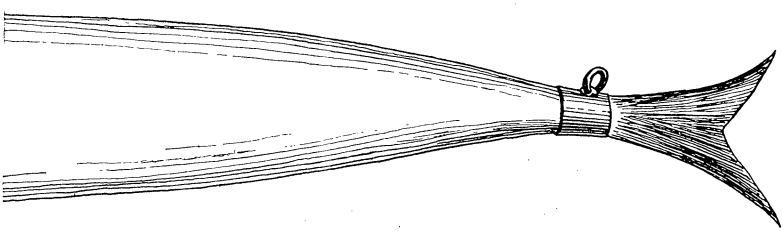
IN the year 1884, Mr. Frederick Holmwood, British Consul at Zanzibar, by publishing an article in the *Proceedings of the Zoological Society of London,* brought this extraordinary use of this remarkable fish to the attention of the scientific world. Chancing on this article, I became greatly interested in the matter and have been led to collect all the available data and to present it herein to those who may be interested.

On a trip in a steam launch from Pemba to Zanzibar, Holmwood had his attention called to a number of remoras which were attached to the sides and bottom of the boat. To these the natives on board gave the name "Chazo." Later at Zanzibar he saw natives digging out diminutive canoes, too small for any normal use, which he was told were for the "Chaza" (so he understood the native word). Now "Chaza" is the word for oysters or other bivalves, hence he thought that these were used to gather such in, but his servant told him that it was a "house" for the "Chazo" or sucking-fish kept by most fishermen in their huts. Later he learned that the native fishermen use the Chazo fish to catch turtles and large fish of any kind. And later still in

Madagascar he was informed that sharks and even large crocodiles were caught by the use of a fish called *Tarundu*[1] which was trained for the purpose. Unfortunately, just here Holmwood gave vent to his incredulity and his informants being greatly incensed refused to talk with him further on this matter.

Holmwood spent considerable time in gaining the confidence of the native fishermen of Zanzibar and was rewarded by being allowed to visit their huts and examine the "Chazo." These he found to be remoras (echeneis?) from 2 to 4.5 feet long and from 2 to 8 pounds in weight. They were kept in the little canoes in the cabins and were so tame as readily to come to the surface of the water at the appearance of their masters, by whom they allowed themselves to be freely handled.

Each Chazo had a strong iron ring or loop fixed just above the tail [text-figure 1] for the purpose of attaching a line to when being em-



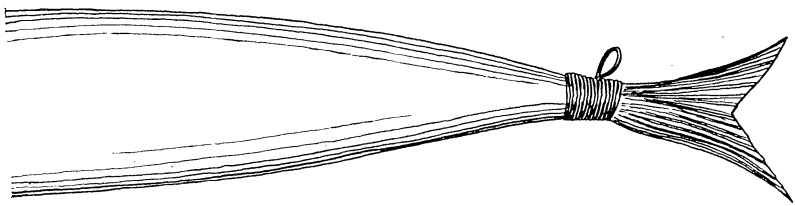
TEXT-FIGURE 1. Tail of sucker-fish with band and ring. (After Holmwood, 1884.)

ployed in hunting. In some cases these appendages had evidently remained on for years, during which the fish had so grown that the iron had become imbedded in a thick fleshy formation. In two instances the ring had been inserted in the muscular substance at the root of the tail [fin], but generally a simple iron band was welded around the thinnest part of the body a few inches from the tail, which kept it from slipping off. To this was riveted a small movable ring or loop resembling that of a watch-handle. In one case [text-figure 2] this loop was fastened on by servings of brass wire in a similar manner to the rings of a fishing rod.

[1] Every effort has been made to trace down the use of the *Tarundu,* but books on the fishes of Madagascar are few, and none of them nor the works of travel consulted have given any clue.

Holmwood purchased one of these fish to send to England but it was killed by a crane. A second one died, probably from lack of a fresh supply of water. He afterwards arranged to buy another on its return from a fishing trip.

It was brought to me a few weeks later minus its ring, and with a large wound or rent above the tail, part of which was gone. The owner declared that it had caught two turtles, which he showed me lying in his canoe, and that it had afterwards affixed itself to a large shark and, holding on after all the spare line had been paid out, the tail had given



TEXT-FIGURE 2. Tail of sucker-fish with loop and servings. (After Holmwood, 1884.)

way. He stated that the Chazo had then relinquished its hold and returned in its mutilated state to the boat. He assured me that this was not an unusual occurrence and that after a time a fresh ring would be attached and the fish become as useful as before. I endeavored to preserve one of these Chazos in spirits of wine, but failed owing to the inferior quality of the spirit. This specimen measured 2 feet 8 inches in length and weighed 3½ pounds. The sucker contained 23 pairs of lamellæ.

Holmwood wanted to go out with the fishermen and see the fishes at work. But as the distance to the fishing-grounds was considerable, as the trips lasted fifteen days, and as the boats were small and lacked accommodations for a European, he was forced to desist. Thus he failed to become an eye witness to this remarkable procedure.[2]

[2] Under date of 1883, a writer signing himself Phil. Robinson published a pamphlet entitled "Fishes of Fancy—Their Place in Myth, Fable, Fairy Tale, and Folk-Lore." This was issued as a hand book for the great International Fisheries Exhibit of that year in London. In this is a verbatim quotation from an article by Holmwood on the use of the fisherman fish in the official catalogue of the exhibition. After much difficulty this official catalogue was located and in it was found Holmwood's original

Holmwood's interesting account is however not the first for the use of the living fish-hook in Mozambique waters. In the year 1829 Lacépède published his "Histoire Naturelle des Poissons," in which, with reference to foreign fishes, he largely made use of the manuscripts of the lamented naturalist, Commerson. On page 490 of Tome III we read:

Commerson . . . has written that this fish (*Echeneis naucrates*) frequents very often the coast of Mozambique, and that near to this coast it is employed for fishing for marine turtles in a very remarkable manner, due to the power which the Echeneis possesses of sticking to them. We think that we ought to report here the data which Commerson has collected on this subject so very curious, the only of the kind which has ever been observed. [?]

There is attached to the tail of the living *Naucrates* a ring of diameter sufficiently large not to incommode the fish, and small enough to be retained by the caudal fin. A very long cord is attached to this ring. When the Echeneis has been thus prepared, it is placed in a vessel full of salt water, which is renewed very often, and then the fishermen place this in their boats. They then sail towards those regions frequented by marine turtles. These animals have the habit of sleeping at the surface of the water on which they float, and their sleep is so light that the least noise of an approaching fishing-boat is sufficient to wake them and cause them to flee to great distances or to plunge to great depths. But behold the snare which they set from afar for the first turtle which they perceive asleep. They put into the sea the *Naucrates* furnished with its long cord. The animal, delivered in part from its captivity, seeks to escape by swimming in all directions. There is paid out to it a length of cord equal to the distance which separates the sea turtle from the boat of the fishermen. The *Naucrates* retained by the line, makes at first new efforts to get away from the hand which masters it. Soon, however, perceiving that its efforts are in vain, and that it cannot free itself, it travels around the circle of which its cord is some fashion a radius, in order to meet with some point of adhesion and consequently to find rest. It finds this asylum under the plastron of the floating turtle, to which it attaches itself easily by means of its buckler, and

account. He wrote up for this an account of the fisheries of Zanzibar and concluded by giving a short description of fishing with the "chazo." This gives in very abbreviated form the data included above, and ends with the sentence "I hope to forward a specimen of this interesting fish before the close of the exhibition." However, as indicated previously he was unable to do this.

gives thus to the fisherman, to whom it serves as a fulcrum, the means of drawing to them the turtle by pulling in the cord.[3]

This account of Commerson-Lacépède's is very circumstantial and exceedingly interesting, but it is not the first account of the fisherman fish, and not even the first for East African waters, for in 1809 and 1810 Henry Salt under orders of the British government made a voyage to Abyssinia by way of the Cape and the Mozambique Channel, stopping at Masuril, a village on the harbor of Mozambique. Of this visit he says under date of September 9, 1809 (his book was published in 1814):

As he [the Bishop of Masuril] was aware of my wish to collect the rarities of the place, he made me a present . . . of a large sucking-fish (*Echeneis naucrates*) . . . which had just been brought in by a fisherman. All the Portuguese gentlemen, whom I conversed with on the subject, agreed in assuring me that fish of this kind were employed on the coast in catching turtles. The mode of doing this is by confining the fish with a line to the boat, when it is said invariably to dart forwards, and to attach itself by its sucker to the lower shell of the first turtle found in the water, which prevents its sinking, and enables the fisherman to secure his prey. The reason for the fish fastening on to the turtle is supposed to be done (as the Bishop observed) with a view to self-preservation, and its strength is so great that, when once fastened, the turtle is rarely known to escape.

Earlier still (in the latter half of the eighteenth century) a Swede named Andrew Sparrman made a voyage to the Cape of Good Hope, and in that part of his book dealing with the land of Natal, in the French translation published at Paris in 1787 he wrote:

They [the inhabitants of the country] carry on a very singular method of fishing for turtles. They take alive a fish called Remora, and fixing two cords, one to its head and the other to its tail, they then throw it into the depths of the sea in the region where they judge that there ought to be turtles, and when they perceive that the animal has attached itself to a turtle, which it soon does, they draw in to them the Remora and with it the turtle. It is said that this manner of fishing is also carried on in Madagascar.

[3] The same account in brief form is found on pages 170–171 of Pasfield Oliver's life of Commerson (1909).

This account is not found in the English translation of Sparrman's voyage, and I have not had access to the original Swedish edition, but it is found in the French edition in a sort of appendix to that section describing South Africa and is credited to Middleton's "Geography." Inspection of volume I (1777) of this latter work revealed the account substantially as given above, but *in quotation marks* with no hint whatever of its ultimate source.

Humboldt (1826) refers to a similar incident related by Captains Dampier and Rogers. Dampier was worked through twice without finding the reference, but a third going through his "Voyages" page by page revealed it as an annex to part 3 of his volume III, "A Discourse of Winds," etc. (6th edition, 1729). Middleton has copied it almost word for word, so it need not be repeated here. It will be of interest, however, to note that Dampier says that this "annexed paper" was "received from my ingenious Friend, Capt. Rogers, who is lately gone to that place ('Natal in Africk'): and hath been there several times before."[4]

It must be remembered that Holmwood wrote of a fish called *Tarundu* used in Madagascar as a living fish hook, and Lacépède quotes Commerson that a sucking fish is so used in the Isle of France as well as in the Mozambique country and lastly that Dampier quotes Rogers as to this use also in Madagascar. Acting on these hints a good deal of time has been spent in hunting for such accounts not only in books on the fishes of these islands but also in books of travel and at this writing three corroboratory accounts have been found. The first is to be found in Pollen's work on the fisheries of Madagascar (1874).

[4] The index to Rogers' book ("A Cruising Voyage around the World," 1726) does not contain the words echeneis, remora or sucking-fish. Careful examination of the book, and a minute inspection of that part relating to South Africa, gave no results whatever. Dampier's "Voyages" show that he was keenly observant of natural history objects wherever he went, while Rogers paid little or no attention to such matters. It seems likely that the foregoing account was communicated to Dampier by word of mouth or by letter from Rogers.

For Malagassy waters he quotes the use of *Echeneis* as given by Middleton, Commerson-Lacépède and Salt, and for other waters other authors to be referred to later. He is not clear as to its use in his own time but he seems to indicate that in his day it was so used.

Our next reference is dated 1897. In the *Antananarivo Annual* for that date (published by the London Missionary Society at the capital of Madagascar) there is under "Natural History Notes" a translation by James Wills of a native manuscript which reads as follows:

> In the sea off the northwest coast of Madagascar a fish is found called by the people Hamby. It is round and long, somewhat like a lizard, but its tail unfolds for swimming like that of a gold-fish, and it has fins on each side. The length of a full-sized one is about that of a man's arm, and its girth about that of his thigh. Its back fin, from about one quarter of its length up to its head, is just like a brush, and it has a liquid about it, sticky like gum, and when it fastens onto a fish from below with this brush on its head the fish cannot get away, but is held fast. On account of this peculiarity of the *Hamby,* the people of Sambirano use it to fish with. When they catch one they confine it in a cage of light wood, which they fasten in the sea, and feed the fish daily with cooked rice, or cassava, or small fish; and when they want to use it, they tie a long string round its tail and let it go, following it in a canoe. When it fastens on a fish they pull it in and secure the spoil. There is a sea-turtle called by the people *Fanóhana,*[5] which the *Hamby* is fond of catching, and this the people prize on account of the shell, which is of commercial value.

The above account is given almost word for word by James Sibree in his book "A Naturalist in Madagascar," 1915. Sibree, whose experiences in Madagascar cover a period of fifty years, and who as his book shows was a very close observer, evidently believed in this use of the fish.

The Hunting-Fish of the West Indies

However, the accounts quoted of the remarkable use of the Remora as a hunting fish in the Mozambique country are not the first that we have of such employment. For the very beginning we must go back to the second

[5] This is probably the tortoise-shell turtle.

voyage of Columbus to the New World in 1494. This account given below is to be found in the writings of Peter Martyr d'Anghera, who was a prominent figure at the court of Ferdinand and Isabella and the foremost letter writer of his day. In 1511 Martyr published at Seville nine books and part of the tenth of his Decade I, the Decade of the Ocean, one of the component parts of his "De Orbe Novo," which has since appeared in many editions and translations. Possibly the best translation available for the general reader is MacNutt's, published by Putnam in 1912, but as better preserving the spirit of the times, I prefer to give Richard Eden's translation made in 1555, the quaint English of which reads as follows:

At the Ides of Maye, the watche men lokinge owte of the toppe castell of the shyppe towarde the Southe, sawe a multitude of Ilandes standinge thick together, beynge all well replenished with trees, grasse, and herbes, and wel inhabyted. In the shore of the continent, he [Columbus] chaunced into a nauigable ryver whose water was soo hotte, that no man myght endure to abyde his hande therein any tyme. The daye followinge, espyinge a farre off a canoa of fyshermen of th(e) inhabitants, fearinge least they shulde flye at the syght of owre men, he commaunded certyne to assayle them pryuily with the shyppe boates. But they fearinge nothinge, taryed the comminge of owre men. Nowe shal you heare a newe kind of fyshinge. Lyke as we with greyhoundes doo hunt hares, in the playne fieldes so doo they as it were with a huntyng fysshe, take other fysshes. This fysshe was of shape or fourme vnknowen vnto vs: but the body thereof, not muche vnlyke a greate yele: havinge on the hynder parte of the heade, a very towgh skynne, lyke vnto a greate bagge or purse. This fysshe is tyed by the syde of the boate with a corde litte downe soo farre into the water, that the fysshe maye lye close hyd by the keele or bottom of the same, for shee may in no case abyde the sight of the ayer. Thus when they espie any greate fysshe, or tortoyse (whereof there is great abundance bygger then great targettes) they let the corde at lengthe. But when she feeleth her selfe loosed, she enuadeth the fysshe or tortoyse as swiftly as an arrowe. And where she hath once fastened her howld she casteth the purse of skynne whereof we spoke before; And by drawyng the same togyther, so graspeleth her pray, that no mans strength is sufficient to vnloose the same, excepte by lyttle and lyttle drawinge the lyne, shee bee lyfted sumwhat above the brymme of the water. For then, as sone as she seeth the brightness of the ayer, she lettethe goo

her howlde. The praye therefore, beinge nowe drawen nere to the brymme of the water, there leapeth soodenly owte of the boate into the sea soo manye fysshers, as maye suffice to holde faste the praye, vntyll the reste of the coompany haue taken it into the boate. Which thinge doone, they loose so muche of the cord, that the hunting fysshe, may ageyne returne to her place within the water: where by an other corde, they let downe to her a piece of the praye, as we use to rewarde grey-houndes after they have kylled theyr game. This fysshe, they caule *Guaicanum,* but owre men caule it *Reuersum.* They gave owre men foure tortoyses taken by this meanes: And those of such byggenes that they almoste fylled theyr fysshinge boate. For these fysshes are esteemed amonge them for delicate meate. Owre men recompensed them ageyne with other rewardes, and soo let them departe.[6]

Curiously enough a repetition of this story by Martyr himself has been completely overlooked by all who have had occasion to refer to his Reversus story. I myself did not find it until, some two years after making notes and copying his account as quoted above from Eden, I chanced to go over the "Decades" again page by page and stumbled on it. Since Martyr himself has not been quoted directly it will be of interest to give this second account from MacNutt's excellent translation of Decade VIII, Book 8, pages 299–300.

Let us now consider the hunting fish. This fish formerly vexed me somewhat. In my first Decades, addressed to Cardinal Ascanio, I stated amongst other marvels, if I remember properly, that the natives had a fish which was trained to hunt other fish just as we use quadrupeds for hunting other quadrupeds, or birds for hunting other birds. So are the natives accustomed to catch fish by means of other fish. Many people, given to detraction, ridiculed me at Rome in the time of Pope Leo for citing this and other facts. It was only when Giovanni Rufo di Forli, Archbishop of Cosenza, who was informed of all I wrote, returned to Rome after fourteen years' absence as legate of Popes Julius and Leo in Spain, stopped the mouths of many mockers, and restored me my reputation for veracity. In the beginning I also could hardly believe the story, but I received my information from trustworthy men whom I have elsewhere cited, and later from many others.

Everybody has assured me that they have seen fishermen use this fish just as commonly as we chase hares with French dogs, or pursue the wild deer with Molossians. They say that this fish makes good eating.

[6] This is a literal copy of Arber's literal copy of Eden, save that the old-fashioned ſ-shaped s has had to be replaced by the modern letter.

It is shaped like an eel, and is no larger. It attacks fish larger than itself, or turtles larger than a shield; it resembles a weasel seizing a pigeon or still larger animal by its throat, and never leaving go until it is dead. Fishermen tie this fish to the side of their barque, holding it with a slender cord. The fish lies at the bottom of the barque, for it must not be exposed to the bright sun, from which it shrinks.

The most extraordinary thing is that it has at the back of its head a sort of very tough pocket. As soon as the fisherman sees any fish swimming near the barque, he gives the signal for attack and lets go the little cord. Like a dog freed from its leash, the fish descends on its prey and turning its head throws the skin pouch over the neck of the victim, if it is a large fish. On the contrary, if it is a turtle, the fish attaches itself to the place where the turtle protrudes from its shell, and never lets go till the fisherman pulls it with the little cord to the side of the barque. If a large fish has been caught (and the fishermen do not trouble about the small ones), the fishermen fasten stout cords to it and pull it into the air, and at that moment the hunting-fish lets go of its prey. If, on the contrary, a turtle has been caught, the fishermen spring into the sea and raise the animal on their shoulders to within reach of their companions. When the prey is in the barque, the hunting-fish returns to its place and never moves, save when they give it a piece of the animal, just as one gives a bit of quail to a falcon: or until they turn it loose after another fish. I have elsewhere spoken at length concerning the method of training it.[7] The Spaniards call this fish Reverso, meaning one who turns round, because it is when turning that it attacks and seizes the prey with its pocket-shaped skin.

This remarkable story of Martyr's has been repeated by many writers from his day almost to this and especially by the Spanish chroniclers of the early political and natural history of the West Indies. Many of these, however, add to the original story certain details which will be of interest to include herein.

The first of these is the historian Oviedo, whose "Sumario" was published but five years (1516) after Martyr's "Decades of the Ocean," and whose "Chronicles" were first published in 1535. My excerpt is taken from the Salamanca edition of 1547, but there is no reason to think that this particular account differs from that found in the earlier editions. We will let Oviedo

[7] This account does not seem to have been preserved. At any rate it is not to be found in MacNutt's translation.

speak for himself, and his account is all the more interesting and valuable because he gives certain details as to the training and care of the fisherman fish which are absent from the other accounts, and of which he seems possibly to have had some personal knowledge.

There is a fishing of these Manati and of the tortoise in the islands of Jamaica and Cuba, which, if what I shall now say were not so public and well known, and if I had not heard it from persons of great reliability, I should not dare to write. And also it is believed that when there were many Indians, natives, on the island Espagnola, they also caught these animals with the Reversus fish. And since the discussion of the history has brought me to speak of the animal, the Manati, it is better that it is to be known that there are some fish as long or longer than a *palma,* which they call the Reversus fish, ugly in appearance but of great spirit and intelligence, which sometimes happens to be caught in their nets along with other fish. This is a great fish and among the best in the sea for eating, because it is dry and firm and without watery parts, or at least it has very few; and many times I have eaten of it and so am able to testify of it.

When the Indians wish to tame and keep any of these Reversus fishes for their use in fishing, they catch it small and keep it always in salt water from the sea, and there they give it food and make it tame, until it is of the size which I have said or a little more, and fit for their fishing. Then they take it out to sea in the canoe or boat, and keep it there in salt water and fasten to it a cord delicate but strong. Then when there is seen a tortoise or any of the large fish which abound in these seas, or some of these Manati or whatever it may be that happens to go on the surface of the water in such a way as to attract attention, the Indian takes this Reversus fish in his hand and strokes it with the other, and tells it to be *manicato,* which means strong and of good courage and to be diligent, and other words exhorting it to bravery, and to see to it that it dare to grapple with the largest and best fish that it may find there [where the fishing is to take place]. And when the Indian sees that the best time has arrived, he lets it go and even throws it in the direction of the large fish. Then the Reversus goes like an arrow and fastens itself on the side of a turtle, or on the belly, or wherever it can, and thus clings to it or to some other large fish. This one, when it feels itself seized by the little Reversus, flees through the sea in one direction or another; and in the meantime the Indian fisherman lengthens the cord to its full length, which is many fathoms, and at the end of this is fastened a stick or cork that it may be for a signal or buoy which will remain on top of the water. In a little while the Manati or turtle, to which the Reversus has attached itself comes to the

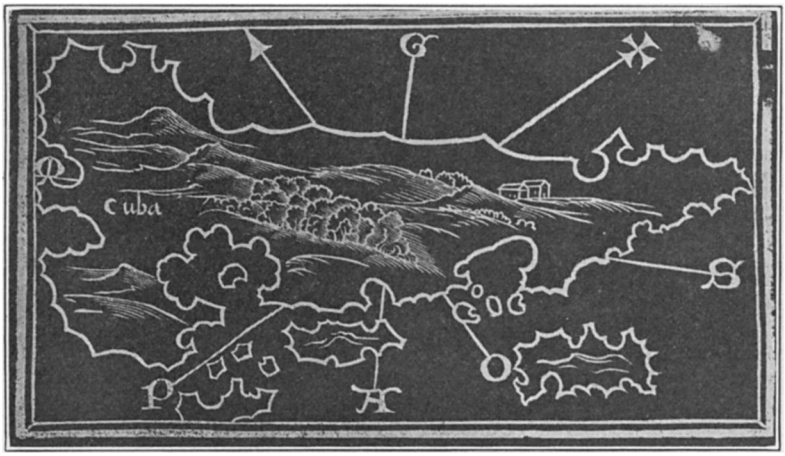
shore, and then the Indian fisherman begins to draw the cord into his canoe or boat and when there are but a few fathoms left, he commences to draw it in carefully and slowly, guiding the Reverso and the prisoner to which it is attached until they reach land and the waves of the sea throw them out. The Indians who are engaged in the fishing leap out on land and if the prisoner is a tortoise they turn it over even before it has touched the ground and place it high and dry because they are great swimmers; and if it is a manati they harpoon, wound and kill it. When the fish has been taken to the land it is necessary very carefully and slowly to release the Reverso which the Indians accomplish with soft words, giving it many thanks for what it has effected, and thus they release it from the other large fish which it captured and to which it is so strongly attached that if it were forcibly removed it would be broken to pieces; and thus in the manner I have described are taken these large fish for whose chase and capture it seems that nature has made the Reverso the sheriff and executioner. It has some scales similar to the corrugations [*grades*] such as are found in the palate or upper jaw of man or horse and therewith certain spines very thin, rough and strong, whereby it attaches itself to the fish it seeks. And the Reverso has these scales or corrugations full of these spines over the greater part of the outer body, especially from the head to the middle of the body along the back and not on the belly, but from the middle of the body up; and from this circumstance they call it the Reverso because with its shoulders it seizes, and fixes itself to fishes.

So credulous is this generation of those Indians that they believe the Reverso well understands human speech and all those words of encouragement the Indian says before releasing it for an attack on the tortoise, manati or other fish, and that it understands also the thanks they afterward give it for what it has done. This ignorance arises from a failure to comprehend that this is a natural characteristic, because it happens many times in the great ocean as I have frequently witnessed, that when a shark or tortoise is captured, Reversos, without having been directed, are found attached to these fish and are broken to pieces on detaching them. From which we may infer that it is not in their power to release themselves after they have attached themselves except after an interval of time or from some other cause I have not determined; because one must think that when the shark or tortoise is taken the Reversos attached thereto would flee if they could. The fact is, as I have said above, for each animal there is its constable.

In 1527, Benedetto Bordoni published his "Isolario." In it is a brief account of the fishing in that locality called Queen's Gardens. It seems to be an abbreviated transcript from Peter Martyr and adds nothing new, save a

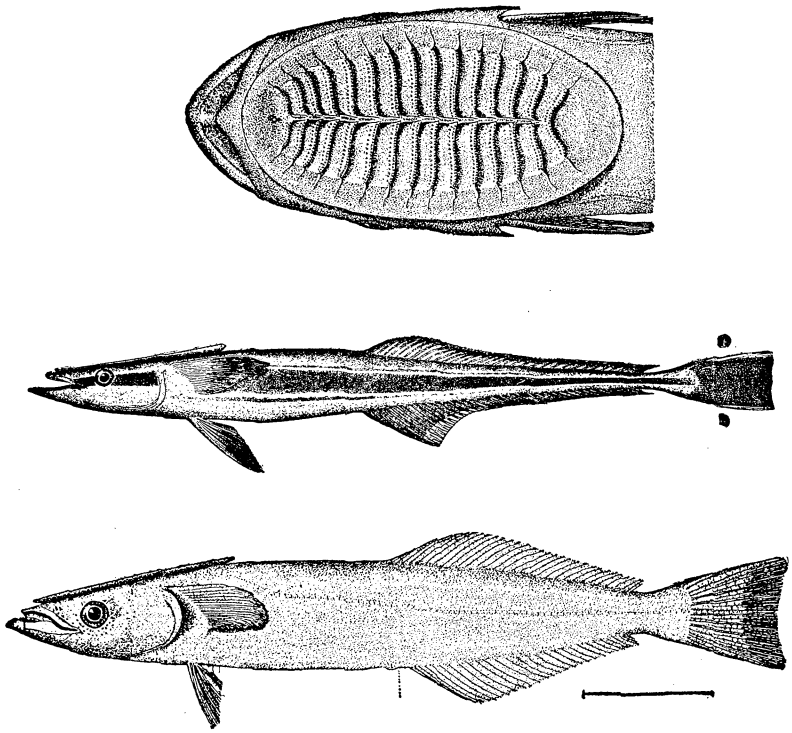
map of Cuba, showing the islands off the southern coast among some of which the fishing with the Guiacan was observed. This seems to be of enough interest to be reproduced herein as text-figure 3.

In 1553, Gomara published at Medina del Campo his "Historia General de las Indias." On folio XIIII is found an abbreviated copy of Oviedo's account of the Reversus fish, but as it contains nothing new it need not detain us.



TEXT-FIGURE 3. The Island of Cuba with the Jardinellas de la Reina to the south. (After Bordoni, 1527.)

The greatest of the encyclopedic writers on natural history in the Renaissance times was the Swiss, Konrad Gesner, who was too good a searcher for the marvellous to let such a story as this escape him. His account (1558) is a somewhat abridged but yet almost literal translation of Peter Martyr. However, he gives us a figure of a hunting scene, showing how this fisherman-fish was used, and this is reproduced herein as Fig. 4, Plate I. The Reversus fish is shaped like an eel and has a great bag or pouch attached on the back of its neck. This pouch has just been thrown over the head of what appears to be a seal (probably meant for a manatee), while a turtle looks on in amazement from one side. In the background in this



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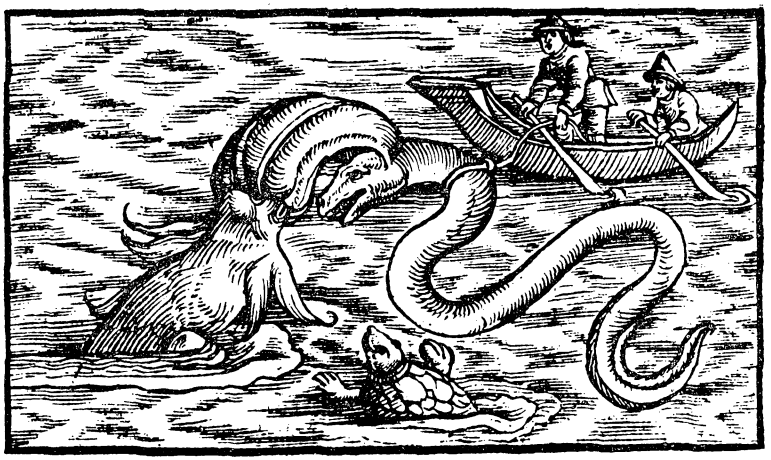


PLATE I

FIG. 1. Sucking-disk of Remora. After Jordan and Evermann, 1906.
FIG. 2. *Leptecheneis naucrates.* After Jordan and Evermann.
FIG. 3. *Remora brachyptera.* After Jordan and Evermann.
FIG. 4. The first known figure of fishing with the fisherman fish. After Gesner, 1558.

boat are the fishermen, one of whom holds one end of a line the other end of which is tied around the anterior part of the body of the eel-like fish.[8] In a sort of postscript Gesner refers to another hunting-fish which is similar to but smaller than the above. This reference, however, is not clear.

The first user of the name Guiacan for our fish was Peter Martyr; other and later writers take the name from him. Considerable effort was made to run down this word and to ascertain its meaning. It was finally found in Bachiller y Morales's "Cuba Primitiva" (1883). Here we are told that

> Guiacan was the name the Indians gave to the fish which the Spaniards called Reverso, and which served them in fishing; because tied by the tail, they fixed themselves to the tortoise and other prey which they did not release, rendering thus a useful service.

Earlier than Bachiller y Morales, another writer, Raymond Breton (1665), calls the huntsmen fish "Iliouali" and says that it is a fish which has on its head a membranous plaque, and if it attaches itself to the canoe it can with difficulty be removed save by breaking it into fragments.

That part of Gesner's "Natural History of Animals" which has to do with fishes was worked over in German and published in 1575 as "Das Fischbuch." In it on page L is found the figure of the hunting scene just referred to and an abbreviated account of the use of the fish as a living fish-hook. Here also there is an account of

[8] Every effort has been made to ascertain the original of this figure. Presumably it is from an insert in some contemporary map or similar publication. Dr. Eastman personally made a search through the rich collection of Americana in the New York Public Library, the able curator of which, Mr. V. G. Paltsits, had to confess himself at a loss. I myself have worked through the collection of reproductions of old maps in the same library but in vain. Finally the question was submitted to Mr. E. A. Reeves, the learned curator of maps of the Royal Geographical Society, London, who courteously made a lengthy search through all the old maps under his care. Finding nothing he passed the question along to the authorities of the British Museum, who in turn could give no help. So the origin of this interesting and oldest figure still remains a mystery.

another Reversus. Apparently herein Gesner has mixed certain data from Oviedo with the legends of another Reversus covered with sharp spines.

It seems that in the writings of these old Spanish historians two fishes are described called Reversus;[9] one the anguilliform kind, having a pouch or sucker on its head, evidently a Remora, or, since it grows larger, an Echeneis; the other the squamous kind covered with scales bearing long spines, evidently the swell fish, Diodon. Concerning these fishes Dr. C. R. Eastman has written several interesting and valuable papers to which the attention of the reader is called. (See Bibliography, Eastman 1915, 1915a, 1916.)

We next hear of the Reversus in the writings of one Antonio Galvano. His book, "The Discoveries of the World from their first Original unto the Yeare of our Lord 1555," was published in the original Portuguese in 1563 under the editorship of his friend, F. Y. Sousa Tavares, and translated and reprinted at London in 1601 by Richard Hakluyt. Neither of these editions being available. I have had to content myself with the Hakluyt Society's reprint[10] found in Vol. 30, 1862, as edited by C. R. D. Bethune. Here there is a short paragraph in which the use of the anguilliform eel is attributed to the squamous form. Nothing new is added and no quotation will be given.

[9] The reversus or "upside down" fish was undoubtedly so named because when attached to the carapace of a turtle its belly was turned upward or outward, as also when it was attached to the side of a fish—in any case its natural position was reversed. Diodon when it inflates its belly with air floats at the surface belly up, hence it too was a Reversus fish.

[10] It is interesting to note that in the Hakluyt reprint the Reverso story is put in square brackets. This considerably confused me and lest others be similarly thrown off the track it seems well to add this note from Mr. C. K. Jones of the Library of Congress, "Hakluyt, when publishing his 1601 edition was unable to find the original. The Hakluyt Society in preparing its 1862 edition secured a copy of the original publication of 1563 from John Carter Brown; and from this copy the Portuguese text was printed." It seems that Hakluyt included in his 1601 edition the Reverso story from original histories. However, in the original Portuguese text, Mr. Jones finds the Reverso story without brackets.

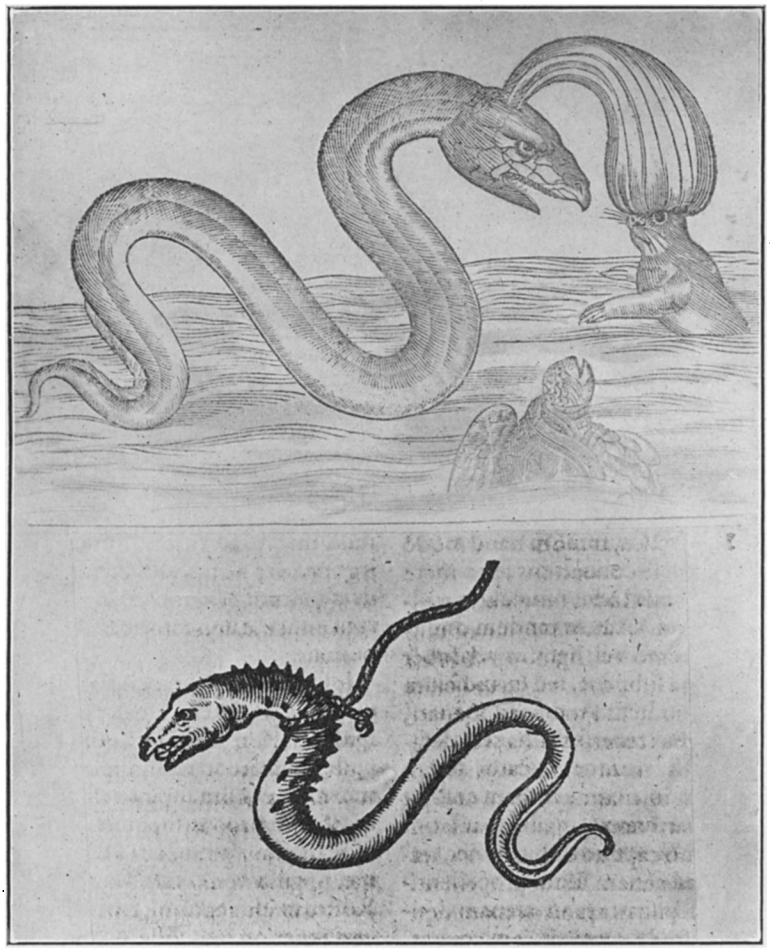
We next hear of the fisherman-fish in Herrera's "Historia Generale de las Indias Occidentales" published in 1601. In Capt. John Stevens's translation we read:

> They [the Indians] fished on, and took some fishes they called *reves*,[11] the biggest of them about the size of a Pilchard, having a roughness on the belly [?], with which they cling so fast, wheresoever they first take hold, that they must be torn in pieces before they can be torn off again. They ty'd these by the Tail with a small Thread, about two hundred Fathoms more or less in Length, and the Fish swimming away on the Surface of the Water, or but a little under it, when it came to where the Tortoise was in the Water, it clung to the under Shell thereof, and then the Indians drawing the thread, took a Tortoise that would weigh a hundred Weight, or upwards. After the same manner they took Sharks, which are most cruel bloody Fishes that devour Men.

Next comes Ramusio, whose "Della Historia dell' Indie" bears date Venetia, 1606. This appears to be merely a translation into Italian of Oviedo's Spanish work. At any rate it adds nothing to our knowledge of the hunting-fish, and may be passed over with this brief notice.

Another of the "fathers" of ichthyology is Aldrovandi, whose great work was published in 1613. He figures and describes both kinds of the Reversus. In general he follows Peter Martyr, but it is very clear that he copies Gesner. However, he has had Gesner's fishing scene redrawn, as may be seen from the reproduction of it herein (Fig. 5, Plate II). The boat and boatman are omitted, as is the cord around the neck of the fish, the seal-like animal has been replaced by another probably intended to represent a manatee, the turtle is entirely different, and lastly the head of the Reversus is not at all that of Gesner's figure. This is much larger, the teeth are more marked, the upper jaw has a hooked beak; and the bag of skin comes more distinctly off the top of the head, and is smaller at the base and has more longitudinal striations. And yet for all these changes it is plainly Gesner's figure.

[11] Reves is of course a variant of the word Reversus, an abbreviation possibly.



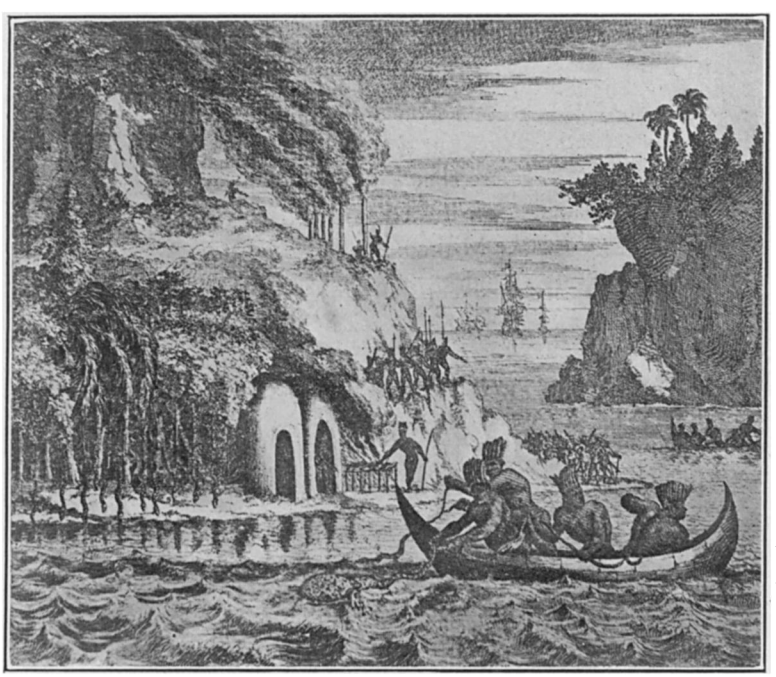


PLATE II

FIG. 5. The Indian anguilliform Reversus. After Aldrovandi, 1613.
FIG. 6. Reversus or Guiacanus, according to Nieremberg, 1635.
FIG. 7. Fishing with the Reversus, from Ogelby's "America," 1671.

In another place Aldrovandi gives a figure of the spinous Reversus, but in his account of this form he gets his data badly mixed since much of it is the data which Peter Martyr ascribes to the anguilliform variety. In neither account does Aldrovandi offer anything new.

We now come to a Spanish work published in Mexico City five years before the Pilgrims landed on Plymouth Rock and when Jamestown was but eight years old. This is Hernandez's work (1615) on the nature and virtues of the plants and animals used in the practise of medicine in New Spain. How he brings in the Remora is not clear, but he attributes his account to Oviedo, the actions of whose anguilliform Reversus he describes in his (Oviedo's) own words. However when he attempts to further describe the fish he gets his account tangled up with that of the porcupine fish. He does not seem to have ever seen either fish.

In 1635, Joannes Eusebius Nieremberg, a Jesuit priest, who was professor of physiology in the Royal Academy of Madrid, published his "Historia Naturae" in folio form. This is a compilation of not very great value, the less so because the references are not set forth clearly. Our interest in his book, in which he quotes Peter Martyr, Oviedo, Hernandez and another to be referred to later, is chiefly centered in his figure of the Reversus or Guiacanus. This is reproduced here as Fig. 6, Plate II. This is plainly Gesner's figure with the addition of a sort of saw-toothed mane on the anterior dorsal region.

Ogilby, whose huge tome was published in 1671, had evidently never seen the Guiacan, but he inserted on page 49 of his "America" such a quaint and interesting figure of his conception (or his artist's) of how this fishing was carried on, that this is reproduced herein as Fig. 7, Plate II.

The Dutchman, Th. van Brussel, in 1799 published a very interesting account of the Reversus; but a careful translation of his Dutch shows that it is but a translation of Martyr and Oviedo, and further that he confuses the

anguilliform and squamous forms of the Reversus—a figure of the latter being given. He also need not detain us.

From this time on a long succession of writers repeat the tale. Thus we find it in Shaw's "Zoology," Vol. IV, 1803; Humboldt's "Essai Politique sur l'Ile de Cuba" (1826), his "Receuil d'Observations de Zoologie et Anatomie Comparée (1833) and in the "Personal Narrative" (English translation, 1860). We also find it in most if not all of the "Lives" of Columbus, notably Irving's (1828), Winsor's (1892), and last and best Thacher's (1903).

To these foregoing accounts we may add a brief note which may be of interest. Bernabe Cobo was a Spaniard (born 1582, died 1657) who wrote his "Historia del Nuevo Mundo" and at his death left it in manuscript where it remained until found, edited and published by the Spanish naturalist, Marcos Jimenez de la Espada, towards the close of the last century. Volume II, Sevilla, 1891, contains Cobo's story which turns out to be the familiar paraphrase of Oviedo's account. Absolutely nothing new is added.

We now come to a consideration of the sources of the various accounts of the use of the sucking fish as a living fish-hook in the West Indies. First of all plainly these later accounts are all echoes of Peter Martyr, or of Oviedo, or of both. Then these further questions naturally arise: Is Peter Martyr's "Decade of the Ocean" in 1511 the first account published? And secondly what is the ultimate source of these earliest accounts? In answering these questions I have had three invaluable sources of information. The one is Justin Winsor's keenly critical life of Christopher Columbus, the second is John Boyd Thacher's monumental work on Columbus (Vol. II, 1903) and the third is the continued advice and unfailing help of my friend, the late Dr. Charles R. East-

man.[12] Dr. Eastman became interested in the subject while working on the great "Bibliography of Fishes" published by the American Museum of Natural History, and finding that I was collecting data for a series of papers on Echeneis most courteously turned over to me invaluable material and aided me in every possible way. At the very time when I was slowly tracing these accounts backward towards their ultimate source, Dr. Eastman in the most brilliant fashion ran these stories down to the original recorder himself.

First of all let us see if Martyr's account in 1511 is the *first* published account of the interesting phenomenon. To this the answer must be "No!" Dr. Eastman sent me the following extract from "Libretto de Tutta la Navigatione de Re de Spagna et de le Isole et Terreni Novamente Trovati," Venezia, April, 1504 ["A Little Book in Regard to All the Navigation of the King of Spain to the Islands and Newly Discovered Lands"]:

> Continuing [along the coast of Cuba] they found further onward fishermen in certain of their boats of wood excavated like *zopoli,* who were fishing. In this manner they had a fish of a form unknown to us, which has the body of an eel, and larger, and upon the head it has a certain very tender skin which appears like a large purse. And this fish they drag, tied with a noose to the edge of the boat, because it cannot endure a breath of air. And when they see any large fish or reptile [*biscia*] they loosen the noose, and this fish at once darts like an arrow at the fish or reptile, throwing over them this skin which he has upon his head; which he holds so firmly that they are not able to escape, and he does not leave them if they are not taken from the water, but as soon as he feels the air he leaves his prey and the fishermen quickly seize it. And in the presence of our people they took four large turtles which they gave our people for a very delicate food.

After Dr. Eastman had sent me the above translation from the Libretto, I very carefully worked over Volume II of John Boyd Thacher's monumental life of Columbus

[12] The recital may perhaps not be devoid of either interest or value if the steps are set forth by which Dr. Eastman and myself, working separately and at a great distance from each other, traced this interesting story back to its original narrator. But it should be said here that Dr. Eastman reached the goal first, and that my efforts were chiefly confined to confirming his results, and clearing up certain details.

and from it much of the data following have been obtained. Only one copy of the Libretto is known in the world, and it is preserved in the San Marco Library at Venice. Thacher traced the original manuscript copy of the Libretto to the ownership of a man named Sneyd, living at Newcastle-on-Tyne, but was refused even the sight of it much less a chance to make photographs. However the authorities of the San Marco Library were men of different caliber, and Thacher reproduces in his book the whole Libretto page by page. And I in turn reproduce here as text-figure 4 a part of Thacher's reproduction of the page giving the Reversus story. It is from chapter XV.

Trouarono dapoi piu auãti alcuni peſcadori ĩ certe ſue barche de uno legno cauo come zopoli ch̃ pe ſcauão. In q̃ſto mõ haueuão un peſce duna forma a noi incognita ch̃ ha el corpo d̃ aguilla: & mazor: & ſupra ala teſta ha certa pelle teneriſſima che par una borſa grãde. Et q̃ſto lo tiẽono ligato cõ una trezola ala ſpõ da dela barcha p̃ che el nõ po patir uiſta de aere: & cõe uedẽo alchun pe ſce grãde o biſia ſcudelera li laſſão la trezola: & q̃llo ſubito corre como una ſaeta al peſce o ala biſcia: butãdoli adoſſo q̃lla pelle ch̃ tien ſopra la teſta cõ laq̃l tiẽ tãto forte ch̃ ſc̃par nõ poſſono: & non li laſſa ſi nol tiri for de laq̃: elq̃l ſubito ſentito laire laſſa la preda. & li peſcadori p̃ſto apiglare. Et ĩ p̃ntia de li nr̃i p̃ſero. iiii. gran caládre, leq̃ e donorono ali nr̃i p̃ cibo dilicatiſſimo.

TEXT-FIGURE 4. Page from the Libretto, 1504, whereon is contained the first printed account of the fisherman fish. Reproduced from Thacker's "Christopher Columbus," II, 1903.

The Libretto of 1504 was the first collection of voyages to the new world ever printed, and as such is of great interest to scientific men for more reasons than those merely pertaining to this article; hence it may be of interest for us to consider for a few minutes its history, which is as follows.

Peter Martyr, born in Italy, was a courtier and literary man of high standing in the entourage of Ferdinand and Isabella. Thacher says: "Peter Martyr d'Anghera may be said to have composed the matter in this little book, writing it in Latin from a series of letters addressed by

him to various noted persons. These letters were written immediately after the events they describe. They bear the first news. They reflect first impressions. . . . This work was put into its present narrative form some time prior to the summer of 1501."

There now enters upon the scene another Italian letter writer, one Angelo Trivigiano, who was secretary to Domenico Pisani, the Venetian ambassador at the Spanish court. Thacher publishes copies of three letters which Trivigiano wrote in 1501 to the Venetian admiral and historian Domenico Malipiero (whose retainer he seems to have been) transmitting copies of various sections of a "voluminous work" on the voyage of Columbus "composed by an able man." Trivigiano nowhere names Peter Martyr as the author, but in all three of the letters he says that the author is the ambassador of the Spanish court to the Sultan of Egypt, and contemporary history informs us that this was no other than Peter Martyr, who left Granada for Egypt, August 14, 1501.

The contents of the Libretto, in Peter Martyr's own words, baring an introductory paragraph by Trivigiano descriptive of the personal appearance of Columbus, was turned over by Malipiero to Albertino Vercelles da Lisona, and by him issued in the Venetian dialect as a printed book on April 10, 1504.[13]

(To be Continued)

[13] The only other historian of Columbus whom I have found to make mention of the Libretto is Winsor, who says that the first seven books of the first Decade were sent in Italian to Venice and there issued as a printed book of 16 leaves in April, 1504.